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General Notes.

GEOLOGY AND PALEONTOLOGY.

The Mexican Meteorites.—Geologists are indebted to Mr. J. R. Eastman for a concise account of the Mexican meteorites. In a paper read before the Philosophical Society of Washington Jan. 2, 1892, he presented the latest and most complete information upon the subject, in a compact form convenient for reference. A list of the iron meteorites, with a table of their weights was given, followed by remarks as to the relative occurrence of iron and stony meteorites.

From the available data the ratio of weight of the former to the latter is as 1 to 12.23. The aggregate weight of meteoric iron observed and discovered to date on this continent is about 153 tons. If the above ratio is true in all cases there should have been a fall of about 1,880 tons of stony meteorites, or in all over 2,000 tons of meteoric matter precipitated upon the earth.

Mr. Eastman offers the following theory to account for the apparent excess of iron over stony meteorites: When a stony meteorite falls to the earth it generally breaks into many fragments, and the ruptured surfaces plainly indicate the nature of the catastrophe. The author knew of no case where an iron meteorite showed any indication of having been twisted, broken, or torn off from another mass of the same material.

The true type of meteorite which reaches the earth from outer space is probably like that which fell in Iowa county, Iowa, on Feb. 12, 1875. This meteorite is composed almost wholly of stony matter, but scattered through the mass are small grains of nickeliferous iron. This iron may exist in the stony matrix in all forms and sizes, from the microscopic nodule to the mass weighing several tons. When the stony mass comes in contact with the earth's atmosphere the impact breaks up the matrix, sets free the iron bodies and they reach the earth in the same condition, so far as mass and figure are concerned, as they exist in the original formation. In such cases it is probable that the stony portion of the original body is rent into such minute fragments by the explosion, that they would not reach the earth in any appreciable size. The larger the masses of iron the more complete would be the destruction of the original body, and the larger stony meteorites would be those that contain the smaller granules of iron. (Phil. Soc. Washington, Bull. Vol. xii, pp. 39–52.)

On the Separation and Study of the Heavy Accessories of Rocks.—For the past few years Prof. Orville Derby, of the Geological Survey of Brazil, has employed the method of washing rock powder in water as the best means of isolating the accessory elements in rocks from the more abundant essential elements. His process differs from that of Cordier and Thurach in that he uses the batêa or Brazilian miner's pan instead of the glass or porcelain dishes of the laboratory.

The knack of washing is readily acquired, and the whole operation, from the preliminary crushing to the mounting of a microscopic slide, can be performed in a few minutes.

The delicacy of the process is well illustrated by the grouping of the minerals during the last stages of the washing. On throwing the sand out into a trail it will be found to be transversely streaked with different colors as the minerals arrange themselves according to their specific gravities. In a decomposed granite, for instance, the outer part will be white with quartz, then a reddish band of garnet, then a black band of titaniferous iron, and, finally (if magnetite be not present), a white band of zircon, or white and yellow if monazite is also present.

Prof. Derby's observations incline him to think that the use of the batêa will prove valuable in work which is more strictly geological, for the following reasons:

1st. Most of the prominent rock groups afford residues which are characteristic, either through the presence of accessories peculiar to each group, or by the relative abundance or peculiarities of form and structure of those that are common to several groups.

2d. Many of the most common heavy accessories are practically indestructible, and can therefore be recovered in recognizable form even when the rocks or their debris are so completely altered that their original type is not otherwise recognizable.

If rock types can be identified by their residues many rock masses can be taken into account which otherwise must be left out.

For purposes of identification only material decomposed *in situ* should be washed.

Prof. Derby also suggests that this method of study of the heavy accessories of rocks may be of value in investigating those rocks which have suffered alteration by metamorphism.

The kind and condition of a mineral constituent may be a means of distinguishing the metamorphosed eruptive from the metamorphosed sedimentary.

After discussing the subject in his usual comprehensive manner, Prof. Derby concludes that there is a reasonable probability that zircon, and to a less degree monazite, may prove to be guide minerals by which eruptives and their derivations can be certainly identified, no matter what degree of alteration they may have suffered. This probability gives additional interest to the study of the heavy residues of rocks which, it is hoped, will lead geologists to thoroughly test this hypothesis in other parts of the world. (Proceeds. Rochester Acad. Sci., Vol. i, pp. 198–206.)

A Section of the Strata at Rochester, New York.—A boring made by the firm of Otis & Gosline in a search for gas in the vicinity of Rochester, N. Y., has made known some interesting facts concerning the thickness of the rock strata of that region. The drill was sent to a depth in the rock of 3,078 feet, where the exceeding hardness of the rock made further progress very difficult. Small quantities of gas were found at various depths. A little brine was encountered at a depth of 1,330 feet.

From a carefully kept well record Prof. H. L. Fairchild has prepared the following condensed section of the Rochester well.

Altitude 484 feet above tide.

HORIZON.	THICKNESS.	KIND OF ROCK.	DEPTH.
Niagara	156 ft.	Niagara limestone, Niagara shale, Clinton limestone	156 ft.
	22 ft.	Clinton upper green shale	
Clinton	15 ft.	Clinton (Pentham) limestone	
	35 ft.	Clinton lower green shale	228 ft.
Red Medina	1075 ft.	Red sandstones and shales	1303 ft.
	25 ft.	Blue shaly sandstone	
Oneida	45 ft.	Hard gray sandstone	
(Oswego)	13 ft.	Dark gray shaly sandstone	1386 ft.
Hudson and Utica	598 ft.	Dark shales	1984 ft.
Trenton	954 ft.	Dark limestone	2938 ft.
	10 ft.	Gray limestone	
	30 ft.	Drab limestone	
Calciferous?	50 ft.	Dark gray limestone with shale	
	44 ft.	Black magnesian limestone	
	3 ft.	Dark calcareous shale	3075 ft.
Algonkian?	2 ft.	White quartz sandstone	
or Archean?	1 ft.	Powdered ferruginous quartz	3078 ft.
	3078 ft.		

The fact that at the nearest exposures the calciferous lies directly upon crystalline rock is the author's reason for referring the last two doubtful rocks to the Algonkian or Archean. (Proceeds. Rochester Acad. Sci., Vol. i, p. 182.)

MINERALOGY AND PETROGRAPHY.[1]

The Eruptives of Cabo-de-Gata.—The eruptive rocks of the Cabo-de-Gata region in southeastern Spain are pumiceous, glassy and granular liparites, andesites, dacites and an occasional basanite. The liparites are rare as fragments in a liparitic tufa and as small dykes cutting the fragmental rocks. The dacites cover a large stretch of country. They are the most abundant types in the region, and are developed in great variety. Two principal groups are distinguished. The first is characterized by the abundance of its phenocrysts, among which are large hornblendes, and by the possession of augite and hypersthene. Augite occurs in their groundmass, quartz is scarce, and their feldspar is almost exclusively plagioclase. In the second group phenocrysts are less common. Biotite is the predominant colored constituent. Quartz and sanidine are both plentiful and the rock thus verges toward the liparites. All the components of these dacites have been very minutely described by Osann.[2] But few of them present special peculiarities. The most interesting features connected with them are the alteration of hornblende into pyroxene and the intergrowth of augite and bronzite, with the pinacoids and prisms of the two minerals parallel. The andesites, which are best developed in the southern and southeastern parts of the region, are hornblendic and biotitic varieties. A mica andesite from the Rambla del Esparto contains an enormous number of granular inclusions composed of cordierite (?) biotite, spinel, sillimanite, corundum, andalusite, plagioclase, rutile, zircon, garnet, quartz and apatite. They are regarded as having resulted from the metamorphism of blocks brought from below, and the crystallization of andesite components upon them. The spinel occurs in dark-green and grayish-red crystals, the former sometimes surrounding the latter. A dacite from Mazarron contains phenocrysts of cordierite,[3] whose prismatic crystals often reach a length of 1 cm. The forms

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] Zeits. d. Deutsch. Geol. Ges. 1891, xliii, p. 688.

[3] Cf. AMERICAN NATURALIST, 1890, p. 69.